Patent Claims

1. Spring-turning apparatus which turns a spring (F) to be in a position suitable for delivery to a spring-transporting apparatus (T), characterized in that the spring-turning apparatus has a cassette wheel (3) which can be rotated about an axis (32), in that the cassette wheel (3) has at least one cassette compartment (30) for holding the spring (F) in a first rotational position, and in that there is at least one first transfer element (32) for delivering the spring (F) to the spring-transporting apparatus (T) in a second rotational position.

2. Spring-turning apparatus according to Claim 1, the cassette wheel (3) having four cassette compartments (30), and the second rotational positional lying at an angle of rotation of 90° with respect to the first rotational position.

3. Spring-turning apparatus according to either of Claims 1 or 2, each cassette compartment (30) being provided with a first transfer element (32).

4. Spring-turning apparatus according to one of Claims 1 to 3, the at least one first transfer element (32) being a pivotably mounted sliding arm.

5. Spring-turning apparatus according to Claim 4, the pivoting arm (32) having a recess for holding the spring (F).

6. Spring-turning apparatus according to one of Claims 1 to 5, the at least one cassette compartment (30) having two opposite walls between which the spring (F) can be held.

7. Spring-turning apparatus according to one of Claims 1 to 6, the apparatus furthermore having rotary plates (21) between which the spring (F) can be held.

8. Spring-turning apparatus according to one of Claims 1 to 7, the apparatus furthermore having a transfer unit (2), the transfer unit (2) having two mutually opposite clamping plates (20) for holding the spring (F) by clamping, and there being at least one second transfer element (22) for delivering the spring (F) from the transfer unit (2) into the cassette wheel (3).

9. Spring-turning apparatus according to Claims 7 and 8, one rotary plate (21) being arranged in each one of the clamping plates (20).

10. Spring-turning apparatus according to either of Claims 8 and 9, the transfer unit (2) being arranged pivotably.

11. Method for forming rows of springs (F), the springs (F) being supplied individually and being delivered at a lower delivery point (B) to a spring conveyor (6), characterized in that the relative position of this lower delivery point (B) with respect to the spring conveyor (6) is changed.

12. Method according to Claim 11, the springs (F) being delivered individually to a transfer conveyor (4) at an upper delivery point (A) which remains constant in its relative position with respect to the spring conveyor (6), springs (F) situated on the transfer conveyor (4) then being conveyed by means of this conveyor (4) to the lower delivery point (B), and being delivered at this lower delivery point (B) to the spring conveyor (6).

13. Method according to either of Claims 11 and 12, the spring conveyor (6) being operated in a constant cycle or at a constant speed.

14. Spring-transporting apparatus having a spring conveyor (6) and a device for transferring springs (F) to the spring conveyor (6), the device transferring individually supplied springs (F) in a lower delivery point (B) to the spring conveyor (6) in such a manner that they are arranged in a row arranged one behind another and at selectable distances from one another on the spring conveyor (6), characterized in that the relative position of this lower delivery point (B) with respect to the spring conveyor (6) can be changed.

15. Apparatus according to Claim 14, there being a transfer conveyor (4) which, at least in some sections, runs parallel and adjacent to the spring conveyor (6) there being a first delivery means (3) at an upper delivery point (A) for delivering the springs (F) to the transfer conveyor (4), and there being a second delivery means (53) for delivering the springs (F) from the transfer conveyor (4) to the spring conveyor (6), it being possible for these second delivery means (53) to be brought to the lower delivery position (B).

16. Apparatus according to Claim 15, the first delivery means (3) delivering the springs (F) at an upper delivery point (A) which remains constant relative to the spring conveyor (6).

17. Apparatus according to one of Claims 14 to 16, the first and second delivery means (3, 53) delivering the springs (F) individually.

18. Apparatus according to one of Claims 14 to 17, the spring conveyor (6) and/or the transfer conveyor (4) being operated by means of a servomotor.

19. Apparatus according to one of Claims 14 to 18, the spring conveyor (6) and/or the transfer conveyor (4) having two revolving belt conveyors (40, 41, 60, 61) which run parallel to each other and between which the individual springs (F) can be clamped.